



(11) Publication number: **0 594 526 A1**

(12)

# **EUROPEAN PATENT APPLICATION**

(21) Application number: **93500145.3**

(51) Int. Cl.<sup>5</sup>: **B60N-2/22**

(22) Date of filing: **21.10.93**

(30) Priority: **22.10.92 ES 9202113**

(43) Date of publication of application:  
**27.04.94 Bulletin 94/17**

(84) Designated Contracting States:  
**BE CH DE FR GB IT LI PT SE**

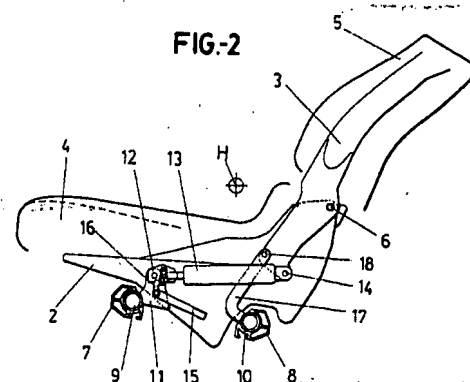
(71) Applicant: **INDUSTRIAS ESTEBAN, S.A.**  
**Polygono Industrial Landaben, Calle L**  
**E-31012 Pamplona (Navarra) (ES)**

(72) Inventor: **Remacha Indurain, Angel**  
**Pio XII, 16-4 B**  
**Pamplona, (Navarra) (ES)**

(74) Representative: **Carpintero Lopez, Francisco**  
**HERRERO & ASOCIADOS, S.L. Alcalá, 21**  
**E-28014 Madrid (ES)**

(54) **A mechanism for adjusting the inclination of a vehicle seat cushion.**

(57) The mechanism is designed so that when the backrest (3) is reclined, the respective inclination changes may be transmitted in synchrony to the seat cushion (2). The seat as a whole rests upon a pair of parts (7) and (8) with the assistance of respective hinge pins (9) and (10). The pin (9) is positively fixed to a support (11) to which a gas spring (13) is hinged, its other end being linked to the backrest (3). When the backrest (3) is tilted back the rear cushion (2) area is lowered because the pin (18) hinging the backrest to a rod (17) linked to the pin (10) cannot rise, which is why the said backward and downward inclination tipping seat cushion (2) takes place.



## SPECIFICATION

### OBJECT OF THE INVENTION

The present invention relates to a mechanical device specifically designed to enable the degree of inclination of the cushion or seat as such to be changed or adjusted in a seat for motor vehicles, and in particular for coaches.

More specifically, the adjustment mechanism subject hereof allows the changes in the reclination of the backrest to be transmitted in synchrony to the cushion, thereby allowing the passenger to ergonomically vary the position of rest, a suitable proportion being maintained between the inclination of the seat and the inclination of the cushion, cancelling the tendency of the body to slide on the cushion in the direction of movement of the vehicle when the backrest is in the position of maximum reclination, in which position the body is slightly retracted, there being no need for a larger space in front for the passenger's knees.

### BACKGROUND OF THE INVENTION

Conventionally, seats for vehicles of the aforesaid kind are fitted with means for the backrest to be reclined, designed to achieve a position of enhanced bodily rest for the user. And yet, because the seat is reclined without the joint movement of the cushion, there is a tendency for the body to move forward, which on the one hand causes the seat as a whole to be uncomfortable and on the other tends to cause the user's knees to bang against the seat that is immediately in front.

In an attempt at overcoming this problem known solutions are provided for instance in European patent 0418731, in which the cushion or seat as such is linked to its support by means of hinge rods that together with other rods joining the said support and the backrest, cause the cushion to be tilted as the backrest is tilted, these operations taking place against the force of heavy-duty springs, a control also being fitted to lock the seat in the selected position.

However the solution used in this European patent is inconvenient in two ways, on the one hand because while the backrest and the cushion are being tilted the seat as a whole moves forward significantly, which means that a greater space or distance between seats is required in order for the user not to bang his or her knees against the seat immediately in front, and on the other hand handling the locking elements is slow and cumbersome.

Another solution is provided in European patent 0383955, in which the front area of the cushion or seat as such is hinged to the support and rests upon the latter through a spring, but in this case though the cushion does not move forward when the backrest is tilted, there is no direct and proportional relation be-

tween the tilting of one element and the other, which means that although the cushion drags the backrest when tilted, when only the backrest is tilted the cushion undergoes no positional change whatsoever, and hence needs to be driven in addition to and distinct from the driving of the backrest.

### DESCRIPTION OF THE INVENTION

The mechanism subject of the invention allows the cushion to be inclined in perfect synchrony with and proportionally to the tilting of the backrest without the said cushion moving forward.

More specifically and in order to achieve the above, the cushion and backrest structures, hinged to each other substantially above the lower end of the said backrest structure, are also linked by means of a gas or mechanical spring, having a multi-position function, controlled by a lever, which spring specifically extends over a front support fixed to the cushion structure, to which it is linked by means of a jaw, being also linked to the rear and lower end of the backrest structure, the said spring being driven by a lever and through the appropriate cam.

In addition to the structure described and as an essential feature of the invention, the front area of the cushion structure is assembled on a fixed body, through the aforesaid gas spring support, whereas at its rear area the said cushion is only linked to the backrest structure through the pin hinging the same to the latter, this backrest structure actually resting upon a fixed rear body, in particular through a crankshaft and a rod.

In accordance with this structure when the backrest structure is tilted backwards through the said spring, by unlocking the same and by exerting front pressure upon the same, the tilting of the structure brings about the tilting of the lower rod about the crankshaft, whereupon the back portion of the cushion is slightly lowered and is hence slightly tilted back, in proportion to the extent to which the backrest is tilted.

### DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a set of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1.- Is a diagrammatic side elevation view of a vehicle seat fitted with the mechanism for adjusting the inclination of its cushion, subject of the present invention, which seat is shown with the backrest at its maximum forward position.

Figure 2.- Is a view similar to that of figure 1, showing the same seat in a position of maximum recline or rear folding of its backrest.

# PREFERRED EMBODIMENT OF THE INVENTION

The above figures show that the adjustment mechanism subject hereof is applicable for vehicle seats (1) in which a cushion structure (2) and a backrest structure (3) are established, the said cushion structure being mounted upon the seat (4) itself, whereas the structure (3) is in turn mounted with the padded body (5) making up the backrest as such, the said elements being linked to each other through a transverse swivel pin (6) that is substantially displaced upwards from the lower end of the backrest structure (3) as can be duly observed in the figures.

The seat (1) is as a whole supported by a fixed front body (7) and a fixed rear body (8) in particular by means of respective pins (9) and (10) that can turn or swing, the front pin (9) being positively fixed to a support (11), rigidly joined to the front portion of the cushion structure (2) and in turn representing the hinge element, through a jaw (12), for a gas spring (13) or a mechanical spring, the other end of which is hinged at (14) to the lower end of the backrest structure (3) and that in the event of a gas spring (13) being provided, is driven by a lever (15) through a cam (16).

The cushion structure (2) rests upon the fixed front body (7) through the support (11), whereas the actual rear fixed body (8) does so through the actual backrest structure (3), which does not rest directly upon the said fixed body (8) either and rather does so with the assistance of a rod (17) the top end of which is hinged at (18) through the respective bolt or transverse pin to the lower end of the backrest structure (3), relatively close to the point (14) at which the said structure (3) is hinged to the spring (13) whereas its lower end is associated to the said pin (10) playing in the fixed body (8) and that is a crankshaft.

In accordance with this structure and as aforesaid, when the backrest (5) is tilted backwards after duly releasing the spring (13), this tilting brings about a substantial elevation of the said hinge pin (18), as shown in figure 2, and because the said swivel pin cannot rise, being linked to the crankshaft (10) through the rod (17), what happens in practice is that at the same time as the backrest (5) is folded back the rear portion of the cushion (4) is lowered in the same proportion, i.e., the said cushion is also tilted down, in particular in a proportion in relation to the turning radius of the said rod (17), thereby for point "H" on the seat to change, causing the passenger to change his or her position of rest ergonomically, depending upon the reclination of the backrest (5), thereby cancelling the tendency of the cushion (4) to slide in the direction of movement of the vehicle, when the seat is in the position of maximum recline, for in such position the said point "H" is lowered and moved back slightly.

We feel that the device has now been sufficiently described for any expert in the art to have grasped the full scope of the invention and the advantages it

offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

## Claims

1.- A mechanism for adjusting the inclination of a vehicle seat cushion, essentially characterised in that the said cushion structure, hinged to the backrest structure, rests its lower area upon a fixed and likewise front body, through a support and a pin that allows the said cushion to be tilted, whereas through its rear area it "hangs" from the lower end of the backrest structure, which in turn rests upon another fixed rear body, in particular through a rod that is hinged to the lower end of the backrest structure and a crankshaft mounted with freedom of rotation upon the fixed rear body, all so that when the gas or mechanical spring used to adjust the backrest position is released and the said backrest is folded back, the point at which the backrest structure is hinged to the said rod shall be tilted, which shall cause the rear cushion area to be lowered, in proportion to the degree of reclination of the backrest and in proportion in relation to the turning radius of the said rod.

FIG.-1

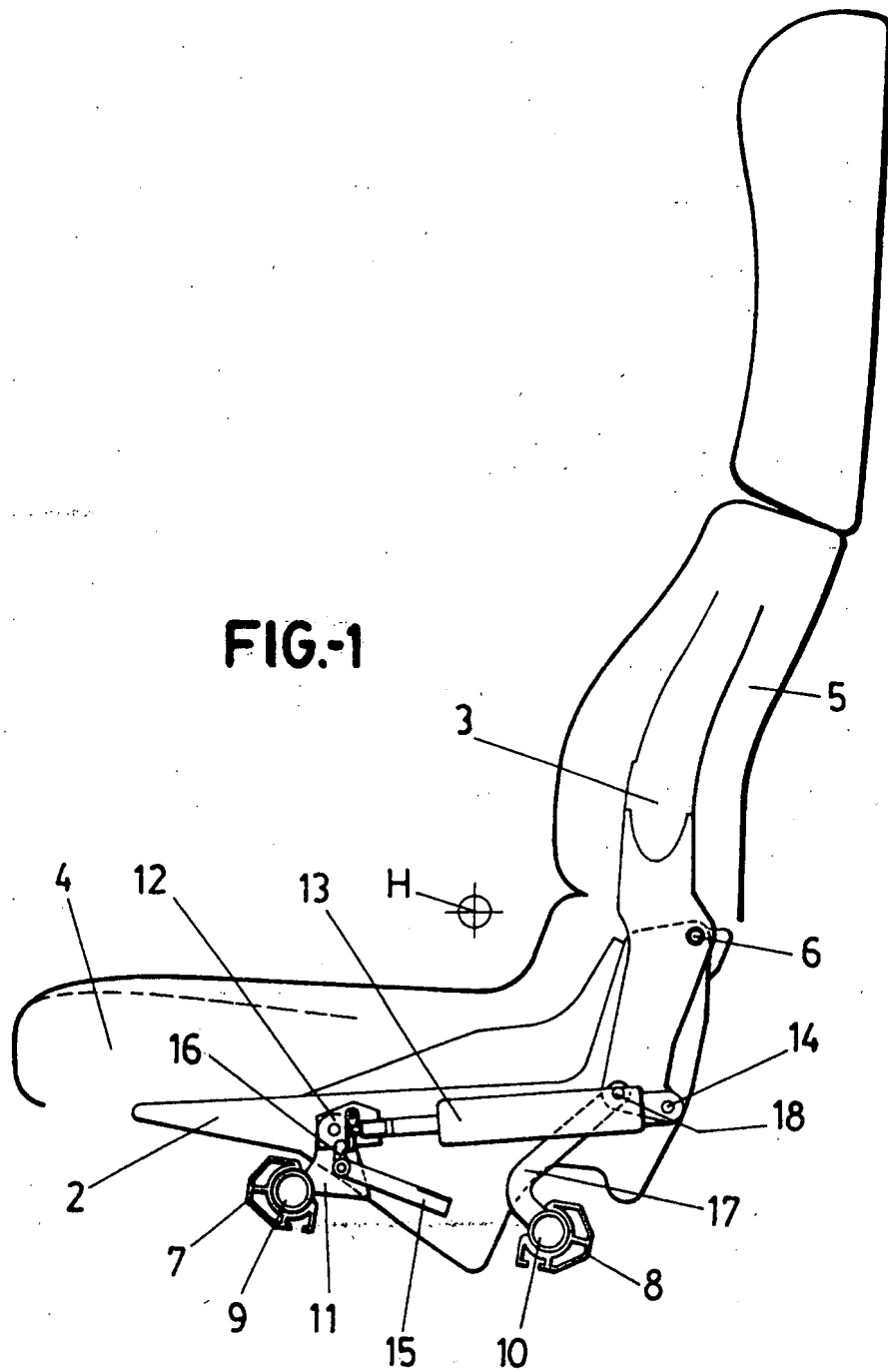
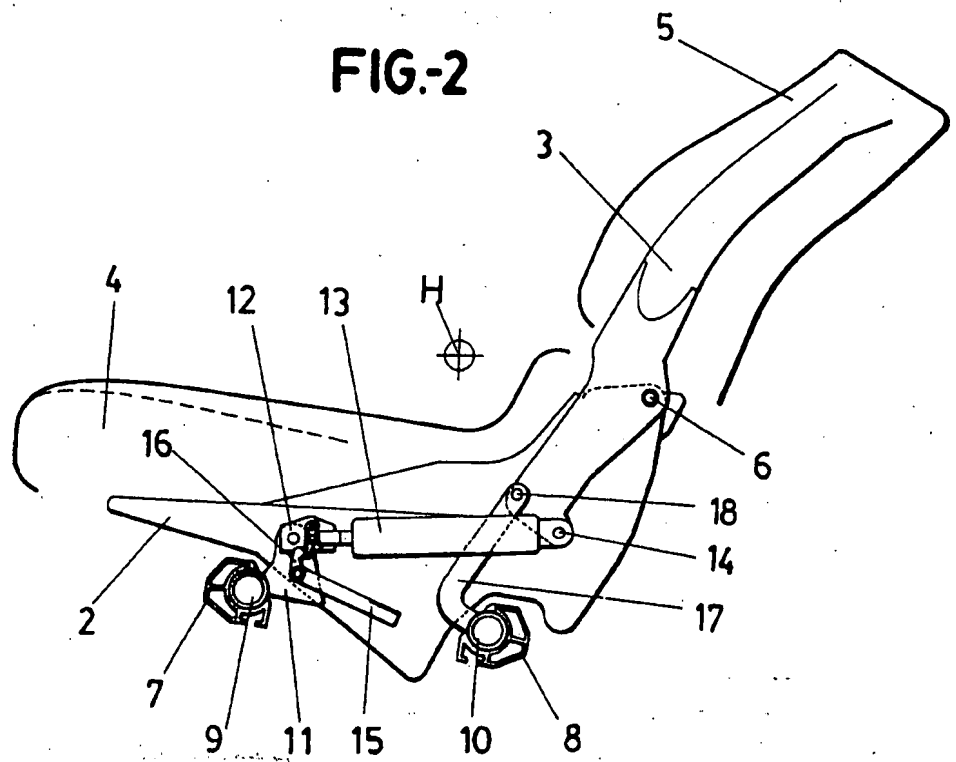


FIG.-2





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 93 50 0145

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	FR-A-2 356 537 (TURNER) * page 1, line 32 - page 3, line 23; figures 1-3 *	1	B60N2/22
A	EP-A-0 508 964 (FIAT) * column 2, line 27 - column 4, line 21; figures 1-8 *	1	
A	FR-A-2 560 757 (RENAULT)		
A,D	EP-A-0 418 731 (VÖLKLE)		
A,D	EP-A-0 383 955 (PAULISCH)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			B60N
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 3 February 1994	Examiner Horvath, R
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons A : technological background O : non-written disclosure P : intermediate document & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category			

EPO FORM 1303 (01.92) (P04001)